

## PATENT ABSTRACTS OF JAPAN

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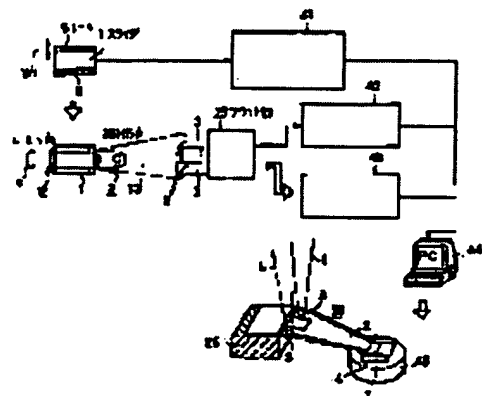
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## (54) PRODUCTION OF FLOATING TYPE MAGNETIC HEAD

## (57)Abstract:

PURPOSE: To set the floating amt. of a slider at a small and exact amt. by coupling a slider and a suspension, then applying heat energy to the spring part of the suspension and adjusting the spring pressure.

CONSTITUTION: The slider 1 is coupled to the suspension 2 and is mounted to a mount 25, by which a magnetic head structural body HGA26 is constituted. The deviation between the center of the slider and a load point is measured and recorded by a measuring and recording means 42. The slider 1 is lifted to a prescribed height Z and the pressing force of the suspension 2 is measured. The HGA 26 is fixed to a prescribed measuring arm by a mount 25 and the roll is measured. The measured value of a measuring means 43 is inputted together with the measured value of the measuring and recording means 41, 42 to a microcomputer 44 which in turn computes the spring pressure to obtain the prescribed floating amt. and the bend in a roll direction. Then, the distance of ABS face of the mount 25 and the slider 1 is set at 2 and while the load of the slider 1 is measured by a measuring means 45, the base part of the spring 3 is irradiated with a laser beam L and the prescribed bending amt. in the rolling direction is set by the discrete spring pressure regulation of the required spring and the spring 3. The slider is then mounted.



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## DESCRIPTION OF DRAWINGS

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### [Brief Description of the Drawings]

[Drawing 1] It is the expansion perspective diagram of an example of the magnetic head obtained by this invention manufacture method.

[Drawing 2] It is drawing with which explanation of spring pressure adjustment is presented.

[Drawing 3] It is the perspective diagram of an example of the gimbal section.

[Drawing 4] It is the flow chart with which explanation of the work of the manufacture method of this invention is presented.

### [Description of Notations]

1 Slider

2 Suspension

3 Spring Section

11 Magnetic Head

12 Gimbal Section

13 Flat Spring (Load Beam)

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] this invention relates to the manufacture method of the risen [ to surface ] type magnetic head for example, in hard disk drive equipment (it is called Following HDD).

[0002]

[Description of the Prior Art] In HDD etc., the magnetic head is arranged at the slider made as [ rise / to surface / from a record medium (it is called Following HD), for example, a hard disk, ], and it is made as / counter / the magnetic head holds necessary \*\*\*\*\* and / to HD, / magnetic head ] at the time of record reproduction operation.

[0003] In this case, a slider is made as [ rise / to surface / by the airstream by relative shift with a record medium ].

[0004] As shown in drawing 1, the slider 1 is made as [ set / the necessary flying height / it is prepared in the free end of the suspension 2 which gives, the elastic press force, i.e., the spring pressure, which resists the above-mentioned surfacing force, and ].

[0005] On the other hand, in HDD, \*\*\*\*\*-izing with the magnetic head and a medium, therefore reduction of the flying height of a slider are required with increase of the recording density. Curtailment-ization to which this flying height attains to submicron less than order, for example, 0.1 micrometers, tends to be expected. And the need for making smaller dispersion in the flying height, i.e., tolerance, with curtailment-izing of this flying height has arisen.

[0006] as this magnetic head, i.e., the generating factor of punishment \*\* of the flying height of a slider, -- \*\*\*\*\* of a slider 1 -- the rail width of face of the rail 5 prepared in so-called ABS (air bearing surface)4, a rail configuration, i.e., the gryposis \*\*\*\*\* crown about the longitudinal direction, the gap with the load point and slider center over a slider are twisted, namely, according [ twist ] to a suspension load, torsion (roll) of a suspension, and a suspension further, etc. are mentioned

[0007] Therefore, in order to make tolerance of the flying height small, it is necessary to bring close to a design value about all these generating factors. However, it being very more difficult for there to be no dispersion to such all factors, and to suppress tolerance, such as each size and a spring pressure, and its erector are the problems which it cannot avoid that change of a spring pressure takes place not a little by the handling in inside etc.

[0008]

[Problem(s) to be Solved by the Invention] In this invention, a suspension is combined to the slider with which the magnetic head was attached, and the manufacture method of the risen [ to surface ] type magnetic head of having enabled it to perform a setup of a narrow surfacing side with small tolerance is offered in the risen [ to surface ] type magnetic head to which the necessary flying height was set.

[0009]

[Means for Solving the Problem] In this invention, as the perspective diagram of an example of the assembly \*\*\*\* surfacing type magnetic head is shown in drawing 1 It combines with the slider 1 with which the magnetic head 11 is arranged, and the suspension 2 which has a pair of spring [ at least ] section 3 which supports this elastically. behind Heat energy is separately given to the spring section 3 of these pairs, the spring pressure of each [ these ] spring section is adjusted, and the necessary flying height is obtained from record intermediation dignity by the slider 1.

[0010]

[Function] A slider 1 is combined with a suspension 2 in this invention. behind It is the thing gives heat energy to the spring section 3 of a suspension 2, and it is made for a necessary spring pressure to produce in these springs section 3,

respectively. Thus, by performing adjustment of the spring pressure of opposite *Perilla frutescens* (L.) Britton var. *crispa* (Thunb.) Decne. in both the springs section, the balance of both spring pressure can perform the inclination of a suspension 2, i.e., rolling adjustment, and the spring pressure of both the springs section 3 can adjust the press force over the whole record medium.

[0011] That is, generally, a spring pressure performs adjustment of a spring pressure, and adjustment specifically according to the fall of a spring pressure while opening mechanical distortion which performed nothing and its postheat treatment and was produced by this incurvation so that spring material may be made crooked and a spring pressure may arise.

[0012] Drawing 2 explains the relation of this spring pressure and heating. in this case, a spring pressure, the state, i.e., the early state, where are the thing, make spring material, such as now, for example, flat spring etc., crooked, and heat energy is not given which time progress was shown in the horizontal axis and showed the spring pressure in the vertical axis, -- T0 A case it is -- When giving heat energy to the spring section 3, it is, the grant time tau 1, i.e., the heating section, of the heat energy. It is tau 1, although it sets and the spring pressure falls. Where after, i.e., heating, is stopped, the spring pressure returns to a certain value. That is, a spring pressure is the early spring pressure T0 in this case. Low value T1 It becomes. It is this state to the section tau 2 further again. When it crosses and heats, it is a spring pressure T1 by the spring pressure's falling and stopping heating. Low spring pressure T2 It becomes. Therefore, it is the early spring pressure T0 about a spring pressure by selection of this heating time or the number of times of heating. It can be made the value of a low request. Therefore, it can set up so that the spring pressure may be measured and it may become a necessary spring pressure, where a suspension and a slider are combined (i.e., when the assembly about the supporter of the magnetic head is completed), as mentioned above. The size configuration of the slider mentioned above by doing in this way, a suspension load, Torsion of a suspension etc., Or since it considered as the necessary load including all of a slider center and tolerance, such as a gap of the load by the suspension, when a setup of the flying height of a slider is completed in accuracy and it considers as the narrow flying height, the small flying height of tolerance can be set up.

[0013]

[Example] An example of the manufacture method by this invention is explained.

[0014] As the \*\*\*\*-expansion perspective diagram is shown in drawing 1 in this invention, the slider 1 which consists of an alumina, a potassium titanate, ARUCHIKU (aluminum<sup>2</sup> the hotpress or sintered compact by mixture of O3 and TiC), etc. is prepared. the field, i.e., \*\*\*\*\*, which counters this slider 1, the record medium, i.e., HD, -- two parallel rails 5 are mutually formed in so-called ABS4, for example, a magnetic gap faces the ABS side 4 at the side of one rail 5 -- as -- for example, the magnetic heads 11, such as the thin film magnetic head of an inductive mold, or (and) the magnetoresistance-effect type thin film reproduction magnetic head, -- it is attached suddenly and arranged in etc.

[0015] This slider 1 is made as [ give / the press force / toward the magnetic-recording media S and HD / by the suspension 2 ].

[0016] It comes to have the so-called load beam which consists of the gimbal section 12 and flat spring 13, an infeed 14 is formed in the base side of the load beam 13, i.e., flat spring, a suspension 2 is made by the shape of \*\*, and every one [ 3 ], i.e., at least a pair of spring section, is formed in the both sides. This spring section 3 is crooked in the shape of [ of "\*\*\*\*" ] a character along with the longitudinal direction of a load beam, respectively, and is fixed to the mounting section 25.

[0017] It is made as [ insert / as the gimbal section 12 shows the \*\*\*\*-perspective diagram to drawing 3 / in the band-like slot 15 established in the opposite side in ABS4 of a slider 1 as it was formed with an elastic metal plate, it bent in the center section, a slot was prepared and this showed drawing 1 ]. While a resilient tongue 14 is formed in the center section of the gimbal section 12 of an infeed, the salient 16 which bulges up is formed in this. On the other hand, the free end of flat spring (load beam) 13 is made as [ attach / the point 17 of the free end / to the salient 16 of the gimbal section 12 ] while being combined with the back edge of the gimbal section 12 by welding etc. Thus, magnetic-head structure \*\*\*\*\* HGA(head gimbal assembly) 26 of which the slider 1 which has the magnetic head 11 is attached in the mounting section 25, and consists through a suspension 2 is fixed to the drive arm (not shown) which has the magnetic head in the predetermined position on the magnetic-recording media S and HD, and causes it in this mounting section 25.

[0018] Thus, the press force which resists the surfacing force of the slider 1 by rotation of record media S and HD and the slider by the airstream by relative shift with HD is given by the suspension 2, and it is made as [ hold / the

necessary flying height / to the field of Medium S / a slider 1 ].

[0019] Each spring pressure adjustment which performed heating which continues locally at necessary time, carries out number-of-times irradiation of necessary of the laser beam L etc., and gives heat energy separately in the spring section 3 of a pair [ the state where combined the suspension 2 and the slider 1 and attached the gimbal section 12 in after, i.e., the point of a suspension 2, in this invention as mentioned above, and the slider 1 was made to engage with this gimbal section 12 ], and was explained to it by drawing 2 is performed.

[0020] The concrete process of above-mentioned spring pressure adjustment is explained with reference to drawing 4.

[0021] First, by measurement / record means 41, the inclination of the width of face WL of the rail 5 of a slider 1, a rail configuration, i.e., the gryposis \*\*\*\*\* crown about the longitudinal direction of a rail, and a rail on either side, the so-called twist, etc. are measured, and the measurement data is recorded.

[0022] As drawing 1 explained this slider 1, it combines with a suspension 2 and magnetic-head structure \*\*\*\*\* HGA26 attached for the mounting section 25 is constituted. And about this HGA26, by measurement / record means 42, a gap of the slider center and load point etc. is measured, and the data is recorded.

[0023] On the other hand, the press force of a suspension 2 is resisted, a slider 1 is raised and set as predetermined height (Z) about HGA26, and it measures, the press force, i.e., the spring pressure, of a suspension 2 at this time. HGA26 is fixed to a measurement arm predetermined in the mounting section 25, the roll in which it is shown by the arrow a of a slider 1, i.e., an inclination, is measured with a collimator etc., the measurement data based on this measurement means 43 is inputted into a computer 44, for example, a microcomputer, with each measurement documentation data in measurement / record means 41 and 42, and the magnetic head 1, i.e., a slider, calculates the deflection of the spring pressure and the roll direction where the predetermined flying height

[0024] Next, a laser beam L is irradiated at a pair of spring section 3 of the flat spring of a suspension 2, i.e., the base both sides of the load beam 13, respectively, setting ABS4 of the mounting position by the mounting section 25, and a slider 1 as the distance, for example, above-mentioned height Z, which was able to be decided to HGA26, and measuring the load of the slider 1 at this time with the load measurement means 45. These laser beams L the laser beam the beam diameter of whose is about 1mm simultaneously Or the necessary time tau 1 explained by drawing 2 about each spring section 3 in time sharing, While necessary carries out number-of-times irradiation with tau2 ....., giving required heat energy, selecting from an early spring pressure to a low spring pressure and, setting up the spring pressure over a slider 1 by the sum of the spring pressure of both the springs section 3 so to speak The deflection of the roll direction is set as the specified quantity by adjustment of the mutual spring pressure of both the springs section 3.

[0025] Thus, HGA26 by which adjustment of the press force of a suspension 2 was made is attached for example, in an HDD head arm through the mounting section 25.

[0026] Thus, the predetermined press force which resisted the press force over the slider 1 by the suspension 2 in the assembly state of HGA26, i.e., the surfacing force by the airstream by rotation of HD, can be given, and the flying height can be set up correctly.

[0027] If it does in this way, this risen [ to surface ] type magnetic head that carried out in this way and was obtained from the ability to be set as the geometry of the rail of a slider 1 or the predetermined load which included all errors, such as a gap of a slider load point, further finally can obtain the very small flying height of tolerance correctly to record media S and HD.

[0028] In addition, in the example mentioned above, although it is the case where the load beam 13 is constituted by flat spring, form the spring section 3 of a couple in the base side by the side of the fixed part, and a necessary spring pressure is acquired, not only the structure that prepared and etc.-mentioned above one or more pairs of spring sections 3 but various composition can be taken.

[0029]

[Effect of the Invention] Since the magnetic-head structure 26, i.e., HGA, can be constituted and a spring pressure can be behind adjusted in this invention as mentioned above A spring pressure can be adjusted including all, such as a gap of the property of a slider 1 and the load point over the slider 1 in HGA26. A setup of the load over the small slider 1 of tolerance can be performed, and by this, when considering as the small flying height by high recording density-ization to record media S and HD, the tolerance can be made sufficiently small.

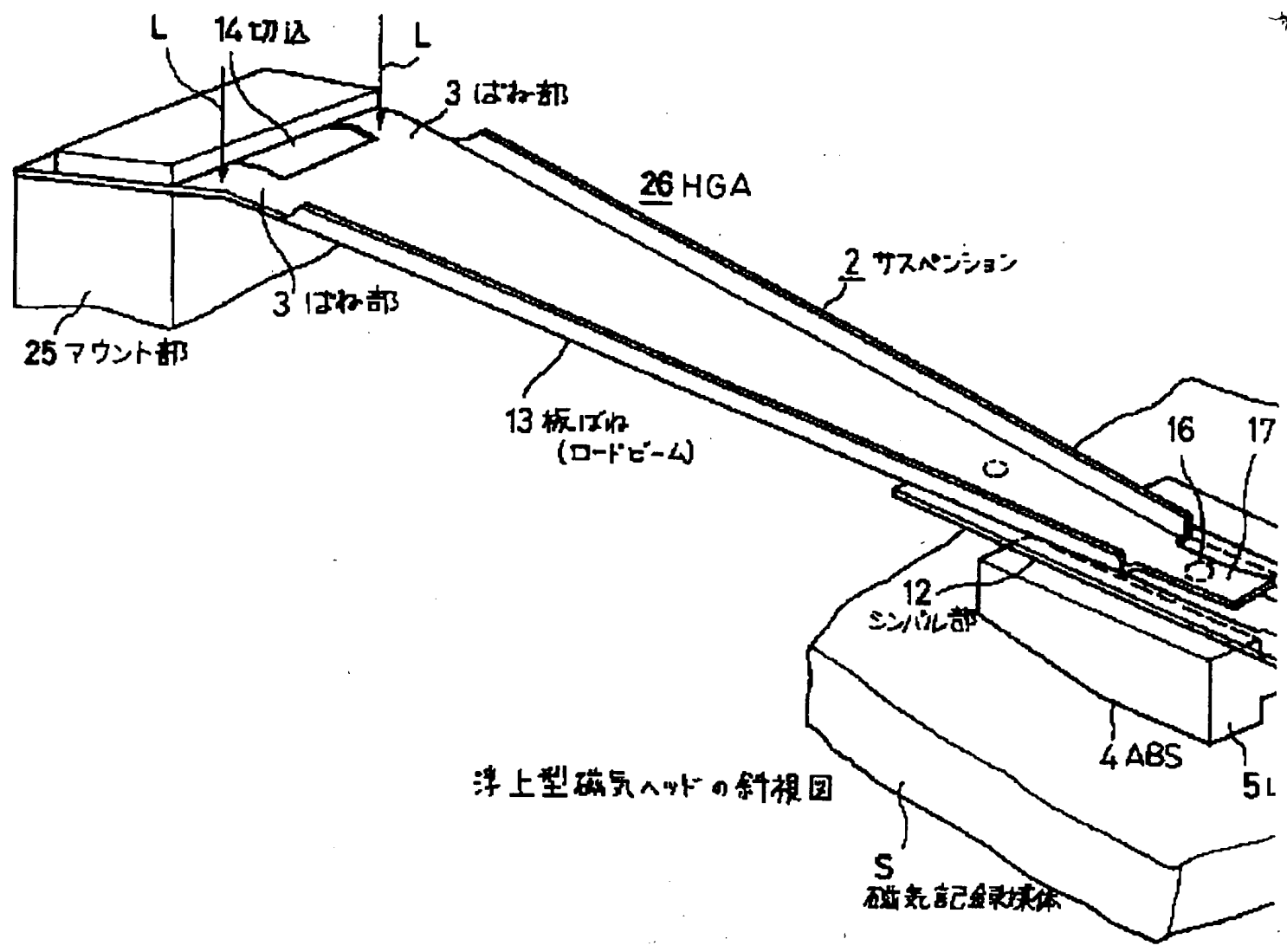
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## CLAIMS

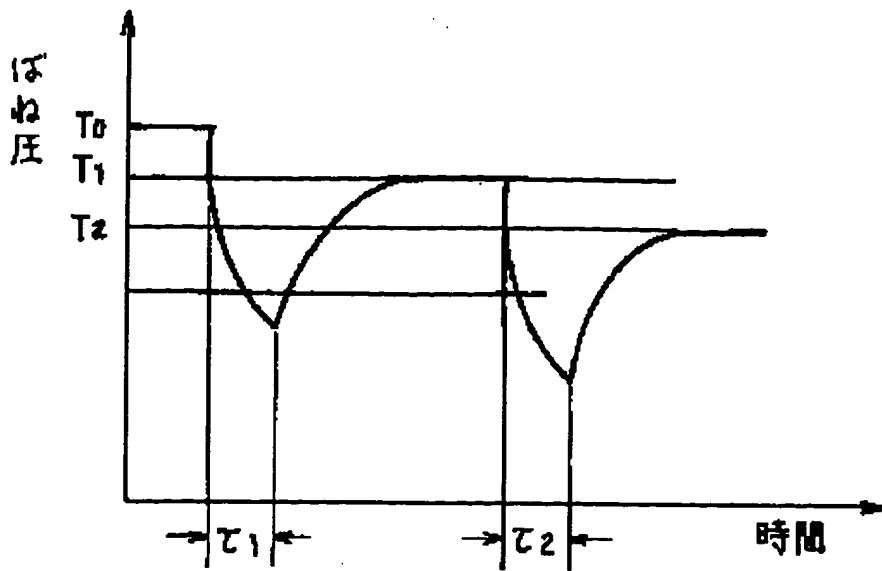
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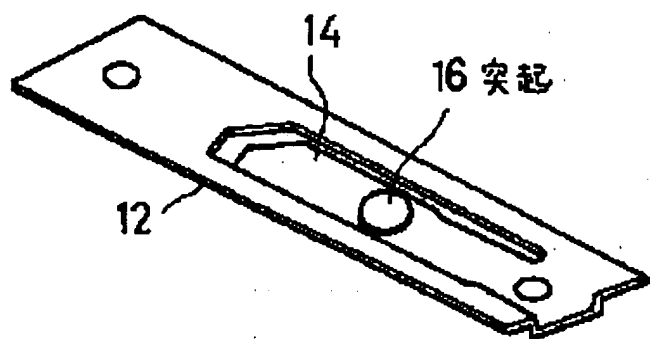
### [Claim(s)]

[Claim 1] The manufacture method of the risen [ to surface ] type magnetic head characterized by combining the slider with which the magnetic head is arranged, and the suspension which has a pair of spring [ at least ] section which supports this elastically, giving heat energy separately to a pair of above-mentioned spring section behind, adjusting the spring pressure of these springs section, respectively, and the necessary flying height of a record medium being obtained by the above-mentioned slider.

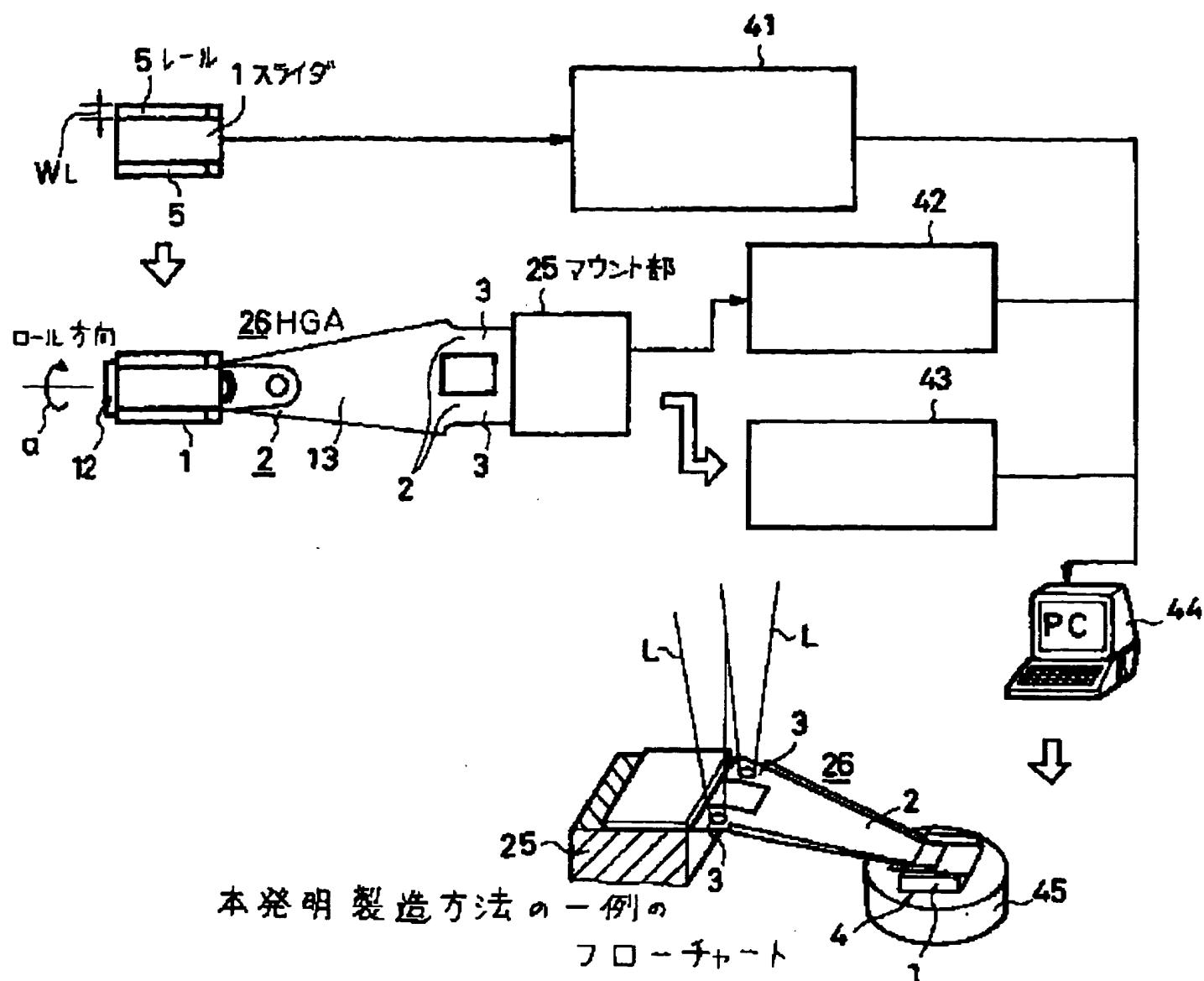








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